U.S. Department
of Transportation
Federal Aviation
Administration

Advisory Circular

Subject: Fabrication of Aircraft Parts by Maintenance Personnel

Date: 06/07/11 **AC No:** 43-18

Initiated by: AFS-300 **Change:** 2

1. PURPOSE. This advisory circular (AC) has been revised to update AC 43-18, Fabrication of Aircraft Parts by Maintenance Personnel, dated February 29, 2008.

2. PRINCIPLE CHANGES. This change updates information regarding the fabrication quality control system (FQCS), AC references, and all references related to Title 14 of the Code of Federal Regulations (14 CFR) part 21.

PAGE CONTROL CHART

Remove Pages	Dated	Insert Pages	Dated
1	02/29/08	1	06/07/11
4 thru 11	02/29/08	4 thru 11	06/07/11
Appendix 1	02/29/08	Appendix 1	06/07/11

ORIGINAL Signed by
/s/ John McGraw for

John M. Allen
Director, Flight Standards Service

U.S. Department
of Transportation
Federal Aviation
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Advisory Circular

Subject: Fabrication of Aircraft Parts by Maintenance Personnel

Date: 2/29/08 **AC No:** 43-18

Initiated by: AFS-300 **Change:** 1

1. PURPOSE. This advisory circular (AC) has been revised to update AC 43-18, Fabrication of Aircraft Parts by Maintenance Personnel, dated March 24, 2006.

2. PRINCIPLE CHANGES. This change updates guidance, including all references related to Title 14 of the Code of Federal Regulations (14 CFR).

PAGE CONTROL CHART

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ORIGINAL SIGNED BY
John M. Allen for

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U.S. Department
of Transportation
Federal Aviation
Administration

Advisory Circular

Subject:	Date:	AC No:
Fabrication of Aircraft Parts by Maintenance Personnel	06/07/11	43-18
	Initiated by: AFS-300	Change: 2

1. PURPOSE. This advisory circular (AC) ensures that parts fabricated during maintenance and alteration have an equivalent level of safety as those parts produced under the original design holder's production certificate. This AC provides one means of complying with the requirements of Title 14 of the Code of Federal Regulations (14 CFR) parts 21 and 43 for the design and fabrication of parts by persons performing maintenance and alterations using methods, techniques, and practices acceptable to the Administrator. As required by regulations, such parts fabrication and their implementation must be accomplished "in such a manner...that the condition of the aircraft, airframe, aircraft engine, propeller, or appliance worked on will be at least equal to its original or properly altered condition." This AC is not mandatory and does not constitute a regulation. It outlines one method (but not the only method) of compliance with the rules. A person may elect to follow an alternative method, provided the Federal Aviation Administration (FAA) finds the alternative method to be an acceptable means of complying with the applicable requirements of 14 CFR.

2. RELATED 14 CFR PARTS.

a. Part 1, Definitions and Abbreviations.

b. Part 21, Certification Procedures for Products and Parts.

c. Part 23, Airworthiness Standards: Normal, Utility, Acrobatic, and Commuter Category Airplanes.

d. Part 25, Airworthiness Standards: Transport Category Airplanes.

e. Part 27, Airworthiness Standards: Normal Category Rotorcraft.

f. Part 29, Airworthiness Standards: Transport Category Rotorcraft.

g. Part 31, Airworthiness Standards: Manned Free Balloons.

h. Part 33, Airworthiness Standards: Aircraft Engines.

i. Part 35, Airworthiness Standards: Propellers.

j. Part 39, Airworthiness Directives.

k. Part 43, Maintenance, Preventive Maintenance, Rebuilding, and Alteration.

l. Part 45, Identification and Registration Marking.

m. Part 65, Certification: Airmen Other than Flight Crewmembers.

n. Part 91, General Operating and Flight Rules.

o. Part 145, Repair Stations.

p. Part 183, Representatives of the Administrator.

3. **DEFINITIONS.** The following definitions apply for this AC:

a. **Acceptable Data.** Data is acceptable to the Administrator when used within the context of maintenance, a minor repair, or an alteration if the data substantiates that the product has been returned to its original or properly altered condition. Acceptable data may establish that the fabricated part complies with applicable airworthiness standards (i.e., regulations). When acceptable data is used to substantiate that the article meets the regulatory requirements and will be returned to its original or properly altered condition, it can be considered acceptable to the Administrator.

b. **Airworthy.** The term "airworthy" is defined in 14 CFR part 3, § 3.5(a): a clear understanding of its meaning is essential in making an airworthiness determination. Furthermore, the definition of airworthy applies to type-certificated products (aircraft, aircraft engine, or propeller), and parts thereof. Title 49 of the United States Code (49 U.S.C.) § 44704(c) and 14 CFR part 21, § 21.183(a), (b), and (c) state that the two conditions that must be met for issuance of an airworthiness certificate are:

(1) The product must conform to its type certificate (TC). A product conforms to its TC when its configuration and the components installed are as described in the drawings, specifications, and other data that are part of the TC, which includes any Supplemental Type Certificates (STC), Airworthiness Directives (AD), and field-approved alterations incorporated into the product; and

(2) The aircraft (product) must be in a condition for safe operation.

NOTE: If one or more of these conditions are not satisfied, the product would not be considered airworthy.

c. **Approved Data.** Data that has been approved by the FAA and that is used to perform maintenance and alterations on products under part 43. Approved data must be used when performing major repairs and alterations. The FAA approves the data in conjunction with the issuance of a TC, STC, Technical Standard Order Authorization (TSOA), or Parts

Manufacturer Approval (PMA). Other forms of approved data include ADs, letters of engineering design approval issued by an FAA Aircraft Certification Office (ACO), maintenance instructions approved by an FAA Designated Engineering Representative (DER), and FAA-approved Structural Repair Manuals (SRM).

> **NOTE: While technical and other forms of data are approved under the field approval process as declared on FAA Form 337, such approved data may not be sufficiently detailed to allow for fabrication of parts that are intended for use in multiple applications.**

d. Certificate Holder. Any person certificated by the FAA and authorized to perform maintenance, preventive maintenance, rebuilding, and alterations as provided in part 43, § 43.3. Within the context of this AC, if a certificate holder intends to fabricate a part for maintaining a product he/she may do so only under the provisions (privileges) of his/her certificate.

e. Certificate Management ACO. The ACO responsible for issuing and overseeing the original design or technical approval under TC, STC, TSOA, or PMA of the product or article on which the fabricated part will be installed. The certificate management ACO is also responsible for managing continued airworthiness of a product for as long as it is in service.

f. Critical. A term of significance applied to a part or to a function performed by a part. A critical part performs a function of such significance (critical function) to the aircraft on which it is installed that, if it failed, the airworthiness of the aircraft would be degraded to an extent that would preclude continued safe flight or landing.

g. Consumed. A fabricated part is considered consumed in a repair when it is installed into the next higher assembly component part, or within a product by the fabricator, while undergoing maintenance or an alteration.

h. Design. Consists of all drawings and specifications, which may be summarized on a master drawing list. These are necessary to show the configuration of the part(s) and all information on dimensions, tolerances, materials, processes, and procedures necessary to define all characteristics of the part(s), as well as, the Airworthiness Limitations Section (ALS) of the instructions for continued airworthiness (ICA).

i. Fabrication. An act in which a part/subpart is made (fabricated) and consumed by the fabricator on the product, or part thereof, in the course of performing maintenance or alterations in accordance with approved or acceptable data, depending on the category (CAT) classification of the part being fabricated and the applicable regulations. In addition, a maintenance record entry must be made with a description of work performed, date of completion, name of person who performed the work, and a satisfactory signature and FAA certificate number.

j. Flight Standards District Office (FSDO). The FAA FSDO that has the responsibility for certificate management over the certificate holder that is undertaking the fabrication of the part or part thereof.

k. Part. For the purposes of this AC, is an article that could be produced under the provisions of 14 CFR part 21 and is eligible for installation on a certificated aircraft without further manufacturing processes.

> **NOTE: The definition of a part for the purposes of this AC would *not* include raw materials or repair segments being utilized for the repair or alteration of a part. (i.e., sheet metal stock, sealants, lubricants, raw forgings, or castings, billet material, etc.**

l. Parts CATs. Parts are classified into one of three CATs, depending on their potential effect on safety. They are listed on a Category Parts List (CPL). Criteria exists for establishing and identifying part CATs, as discussed in paragraphs 6d(1) and 7b(1) through (3) of this AC. The criteria details the level of FAA involvement necessary to approve the fabrication of such parts. It also specifies the level of technical data, quality control system, procedures development, and processes necessary to substantiate fabrication of such parts within each CAT.

m. Project ACO. The ACO is responsible for a project, which results in approving data submitted by the fabricator to FAA for fabricating the part. The project ACO may be required to coordinate with the certificate management ACO, depending upon the criticality classification and complexity of the part to be fabricated.

n. Production. An act in which a part is manufactured under part 21 to an approved design, or to an established industry standard or specification recognized by the United States.

o. Subcontractor. A person providing parts, materials, or related services (welding, plating, machining, etc.) to the certificate holder responsible for fabrication of the part. The subcontractor must be subject to control and surveillance by that certificate holder who is ultimately responsible for the airworthiness of the part and its fabrication processes.

4. RELATED READING MATERIAL (current editions).

a. FAA Orders. You may obtain the current editions of these orders from the FAA Web site at http://www.faa.gov/.

(1) Order 8110.42, Parts Manufacturer Approval Procedures.

(2) Order 8120.2, Production Approval and Certificate Management Procedures.

(3) Order 8120.11, Disposition of Scrap or Salvageable Aircraft Parts and Material.

(4) Order 8130.2, Airworthiness Certification of Aircraft and Related Products.

(5) Order 8900.1, Flight Standards Information Management System (FSIMS).

b. Advisory Circulars. You may obtain the current editions of these ACs from the FAA Web site at http://www.airweb.faa.gov/rgl.

(1) AC 20-62, Eligibility, Quality, and Identification of Aeronautical Replacement Parts.

(2) AC 21-29, Detecting and Reporting Suspected Unapproved Parts.

(3) AC 43-9, Maintenance Records.

(4) AC 43.9-1, Instructions for Completion of FAA Form 337 (OMB NO. 2120-0020), Major Repair and Alteration (Airframe, Powerplant, Propeller, or Appliance).

(5) AC 43.13-1, Acceptable Methods, Techniques, and Practices--Aircraft Inspection and Repair.

(6) AC 43.13-2, Acceptable Methods, Techniques, and Practices--Aircraft Alterations.

(7) AC 43-210, Standardized Procedures for Requesting Field Approval of Data, Major Alterations, and Repairs.

(8) AC 91-82, Fatigue Management Programs for Airplanes with Demonstrated Risk of Catastrophic Failure Due to Fatigue.

(9) AC 120-77, Maintenance and Alteration Data.

5. BACKGROUND.

a. Authority to Fabricate Parts. Maintenance personnel have raised questions and concerns regarding their authority to fabricate aircraft parts during the course of performing maintenance and alterations on a product or part thereof. Typically, such questions center around whether a person needs an approval under part 21 to produce parts for installation on type-certificated products or whether it is permissible to use the maintenance rules outlined in part 43 to fabricate parts for consumption during maintenance or alteration. Previous questions were evaluated against regulatory criteria and answered on a case-by-case basis.

b. Difference in Rules. It is important to emphasize that design and production rules differ from maintenance and alteration rules. Therefore, it is crucial that the FAA organization responsible for each of these different activities is appropriately involved when acquiring approvals. For example, FSDO inspectors have the necessary knowledge on requirements for maintaining a product, whereas Manufacturing Inspection District Office (MIDO) inspectors possess the expertise and familiarity with the requirements for manufacturing parts and their use of specific materials and processes. Compliance with both the maintenance and manufacturing requirements is the only way a certificate holder can ensure that a fabricated part is airworthy. This AC provides guidance for establishing a system that ensures the same level of safety for parts fabricated under part 43, for maintenance or repair purposes, as those produced under the production rules under part 21.

c. Conformance to Approved Design. Any person who engages in the design, production, operation, maintenance, or alteration of a civil aviation product is responsible for ensuring that the part/product conforms to its approved design and is in condition for safe operation. Therefore, an appropriately rated certificate holder that fabricates a part in the course of performing maintenance or alterations must possess:

(1) Approved design data or data acceptable to the Administrator that is determined by the CAT classification for the part being fabricated; and

(2) A FQCS (FQCS) to ensure each fabricated part conforms to its design data and is in a condition for safe operation.

6. FABRICATION UNDER 14 CFR PARTS 21 AND 43.

a. Important Considerations. Many elements affect the nature of the processes and extent of the requirements needed to fabricate parts during the course of performing maintenance and/or an alteration. This includes such elements as: the criticality (application) of the part being fabricated, any processes required for fabrication, sufficiency of design data, equipment necessary for fabrication of the part, and the extent of FAA involvement in data approval to ensure the pertinent airworthiness requirements of the product are satisfied. Parts design data may be approved under § 21.8(d) and fabricated under § 43.13(a) and (b), providing the fabricator installs the part onto or within the product or part thereof while it is undergoing repair or alteration.

NOTE: A certificate holder that desires to sell his/her fabricated parts separately (i.e., outside the course of performing maintenance or an alteration) must obtain a PMA (refer to § 21.9(a)).

b. Limitations. Parts fabrication must be performed within the privileges and limitations of the certificate holder's FAA authorization and ratings and in accordance with his/her established quality control system.

c. Subcontractor Limitations. When a subcontractor is used in the fabrication process, the certificate holder under whose surveillance the fabrication occurs must control the design, manufacture, and quality of the part. The work performed by the subcontractor must be documented to support a determination of conformance to the purchase order requirements and substantiated by a maintenance record. The documentation must describe any special processes. Subcontractors must be subject to control and audit by the certificate holder fabricating the part for return to service.

d. Required Documentation. Procedures for addressing the criteria recommended in paragraph 6d(1)(a), 1 through 7 below must be documented and recorded in a manual or similar type of document, easily understood, and readily available to the person(s) fabricating the part(s).

(1) Required Data. This data must include the following, dependent on the CAT of the part as defined in paragraph 7, Determining Part Category.

(a) For CAT 1 and CAT 2 Parts:

1. Drawings and specifications necessary to show the configuration of the fabricated part.

2. Information on materials, dimensions, and processes (including special manufacturing processes) necessary to define the structural strength or other critical characteristics of the fabricated part.

3. Inspection and test procedures.

4. Substantiating data (test reports, analysis, computations, and assessments) necessary to show that the design data used to fabricate the part for a repair or alteration meets

the applicable airworthiness standards and that no detrimental consequences will result in degradation to the next higher-level subassembly or assembly, or to the product.

5. Airworthiness limitations, as applicable.

6. ICA/maintenance instructions if the application for design approval is sought for a product or article in which the fabricated part is eligible for installation, was filed on or after January 28, 1981.

7. Fabricated part marking.

(b) For CAT 3 Parts: Data adequate to substantiate that the fabricated part as consumed within the repair or during the alteration returns the product to its original or properly altered condition, e.g., AC 43.13-2B, Service Bulletins (SB), component maintenance manual (CMM), service history, or prior service experience, etc., in accordance with § 43.13(b).

NOTE: All fabrication repairs of parts must be accomplished in accordance with methods, techniques, and practices acceptable to the Administrator in accordance with § 43.13(a).

(2) FQCS. In order to substantiate and demonstrate that a part being fabricated during the course of performing maintenance conforms to the approved design data and is in condition for safe operation, quality control system procedures should be established for ensuring all processes and requirements necessary to fabricate the part are identified and adhered to. The depth and detail of the FQCS depends on the complexity and CAT classification of the part being fabricated. The following are recommended elements that could be addressed in the FQCS:

(a) Design data control. Procedures for controlling design data and subsequent changes to ensure that only current, correct, and approved or acceptable data is used.

(b) A list of the parts fabricated by nomenclature and part number.

(c) Document control. Procedures for controlling quality system documents and data and subsequent changes to ensure that only current, correct, and approved or acceptable documents and data are used.

(d) Subcontractor control. Procedures that:

1. Ensure that each subcontractor-furnished part conforms to its approved design; and

2. Require each subcontractor to report to the fabricator if a part has been released from that subcontractor and subsequently found not to conform to the applicable design data.

(e) Inspecting and testing. Procedures for inspections and tests used to ensure that each part conforms to its approved design.

(f) Inspection, measuring, and test equipment control. Procedures to ensure calibration and control of all inspection, measuring, and test equipment used in determining conformity of each part to its approved or acceptable design. Each calibration standard must be traceable to a standard acceptable to the FAA.

(g) Inspection and test status. Procedures for documenting the inspection and test status of parts supplied to the approved design.

(h) Nonconforming part control.

1. Procedures to ensure that only parts that conform to their approved or acceptable design are installed on a type-certificated product. These procedures must provide for the identification, documentation, evaluation, segregation, and disposition of nonconforming articles. Only authorized individuals may make disposition determinations.

2. Procedures to ensure that discarded articles are rendered unusable.

(i) Corrective and preventive actions. Procedures for implementing corrective and preventive actions to eliminate the causes of an actual or potential nonconformity to the approved design or noncompliance with the FQCS.

(j) Handling and storage. Procedures to prevent damage and deterioration of each part.

(k) Control of quality records. Procedures for identifying, storing, protecting, retrieving, and retaining fabrication quality records associated with the part must be retained in accordance with regulatory requirements.

(l) Internal audits. Procedures for planning, conducting, and documenting internal audits to ensure compliance with the FQCS. The procedures must include reporting results of internal audits to the person responsible for implementing corrective and preventive actions.

(m) In-service feedback. Procedures for receiving and processing feedback on in-service failures, malfunctions, and defects. These procedures must include a process to—

1. Address any in-service problem involving design changes; and

2. Determine if any changes to the ICAs are necessary.

(n) Quality escapes. Procedures for identifying, analyzing, and initiating appropriate corrective action for products or articles that have been released from the quality system and that do not conform to the applicable design data or quality system requirements.

(3) Part Marking. Except as noted below, fabricated parts must be clearly identified with an additional permanent and legible marking.

(a) The marking must include the following:

1. The name, trademark, or symbol of the FAA certificate holder (fabricator) under whose control the fabrication occurred;

2. A unique part number that clearly distinguishes the fabricated part; and

3. The original manufacturer's part number if removed as a result of the fabrication.

(b) Critical parts must be marked in accordance with part 45, § 45.15. This part marking provides traceability for subsequent operators and maintenance providers to the source of the fabricated part.

> **NOTE: In cases where it is impractical to mark the fabricated part without compromising the airworthiness (integrity) of the part, the marking information should be included in the maintenance records for the part or part thereof.**

(4) ICA. Under § 21.50, design approval holders are required to develop and distribute information essential to continued airworthiness of their parts and/or products. Typically, these instructions are included in maintenance and overhaul manuals to describe the methods, techniques, and practices for performing inspections, maintenance, preventive maintenance, and alterations to ensure that the affected products are maintained in an airworthy condition. Certain sections of the ICA, and any changes to those sections, (e.g., airworthiness limitations, wiring diagrams, or SRM revisions) require FAA approval. When parts are fabricated during the course of performing maintenance, the fabricator must address the following ICA requirements that may be applicable to the fabricated part(s).

(5) Determine whether the existing ICA for the original part is sufficient to ensure the fabricated part continues to meet all airworthiness requirements.

(6) In cases where the original part manufacturer's ICA has been determined to be inadequate, the fabricator must develop its own ICA to ensure continued airworthiness of the fabricated or affected part.

(7) When it is necessary to develop a new ICA, current inspection criteria essential to the airworthiness of the part(s) must be maintained and kept current.

(8) When the certificate holder develops its own ICA, it must be provided with the part and made available to any other person requesting the ICA for maintaining the fabricated parts.

(9) Revision control for the ICA must be maintained to ensure it remains applicable. This is particularly important when changes are made to the original product and the ICAs were changed to accommodate installation of a fabricated part.

> **NOTE: Each Aircraft Certification Service (AIR) Directorate has an established Aircraft Evaluation Group (AEG) that is part of Flight Standards Service (AFS) and is directly responsible for the operational and maintenance aspects of the certification process.**

(10) Fabrication of Multiple Parts. A quantity of identical parts bearing the same part number may be fabricated at the same time, providing they will be consumed in later repairs by the certificate holder that fabricated those parts. Controls should be in place to prevent separate sales of these specific parts (i.e., sales to other persons independent of the repair). If a certificate holder desires to sell its fabricated part(s) separately, it must obtain a PMA. The fabrication of multiple parts is not to be used as a means to circumvent the requirements of § 21.9(a).

(11) Recordkeeping. Fabrication of a part in accordance with this AC is subject to the maintenance recordkeeping provisions of § 43.9. A recordkeeping system should be established for documenting fabricated parts containing sufficient information to determine the airworthiness status of the part. Information contained in the maintenance record entry could include a description of work performed, date of work completion, person approving return to service, current status of any AD, current inspection status, and current status of life-limited parts. These maintenance records should be retained with the aircraft records.

(12) Destruction of Replaced Material. Material replaced by the fabricated part should be mutilated/destroyed beyond any possibility of repair or reassembly and should not be retained for future use.

7. DETERMINING PART CAT.

a. Criticality Level—CPL.

(1) For the purposes of this AC, the FAA recommends use of the CPL (a copy of the CPL can be found in Appendix 2), in combination with other factors, to determine a part's criticality level. The CPL classifies parts into one of three CATs depending on their effect on safety. The CPL should be used as a guide in determining a part's criticality. It's important to understand that not all component parts have been addressed on this list, and therefore, specific questions concerning parts not addressed can be evaluated by contacting the certificate-holding ACO.

(2) When used in the context of this AC, this CPL is a means to determine the criticality category of the part and the level of AIR involvement needed in the design data approval process for certificate holders fabricating parts.

> **NOTE: No part, or fabricated part thereof, that is the subject of an AD can be installed on an aircraft without complying with the AD or obtaining an alternative method of compliance (AMOC) approval from the responsible ACO.**

b. Part Categories.

(1) CAT 1 Part. A fabricated part, the failure of which could prevent continued safe flight and landing; resulting consequences could reduce safety margins, degrade performance, or cause loss of capability to conduct certain flight operations.

(a) Design Issues. A CAT 1 part is a part intended to be consumed within a major repair or major alteration. The certificating ACO, through the geographic ACO, must approve

the design data. The list of data to be submitted to the ACO can be found in paragraph 6d(1)(a). The ACO will make the determination of necessary data for development and submittal based on each circumstance. In the case of a CAT 1 part, a DER may only "recommend approval" of the design data.

(b) Fabrication Issues. The certificate holder is responsible for ensuring all aspects of the FQCS are addressed and satisfied. The guidelines provided in paragraph 6d(2) should be used to develop the FQCS for compliance.

(2) CAT 2 Part. A fabricated part, the failure of which would not prevent continued safe flight and landing, but would reduce the capability of the aircraft or the ability of the flightcrew to cope with adverse operating conditions or subsequent failures.

(a) Design Issues. A CAT 2 part is a part intended to be consumed within a major repair or major alteration. Design data is required to be approved by the geographic ACO or appropriately authorized DER. The list of required data to be submitted to the ACO or the DER for approval can be found in paragraph 6d(1)(a).

(b) Fabrication Issues. The certificate holder is responsible for ensuring all aspects of the FQCS are addressed and satisfied. The guidelines provided in paragraph 6d(2) should be used to develop the FQCS for compliance.

(3) CAT 3 Part. A fabricated part, the failure of which would have no effect on the continued safe flight and landing of the aircraft.

(a) Design Issues. The fabrication of a CAT 3 part will generally require only acceptable data. Fabrication of this type of part will typically result in no involvement by AIR unless the AFS aviation safety inspector (ASI) requests assistance.

(b) Fabrication Issues. The certificate holder is responsible for ensuring all aspects of the FQCS are addressed and satisfied. The guidelines provided in Appendix 1 should be used to develop the FQCS for compliance with paragraph 6d(1)(b).

NOTE: A summary of the certificate holder requirements for data based on the CAT of the part can be found in Appendix 1.

APPENDIX 1. SUMMARY OF REQUIREMENTS FOR CERTIFICATE HOLDERS SEEKING TO FABRICATE PARTS PURSUANT TO 14 CFR PART 21 AND PART 43

Fabrication Part Category	FQCS	Required Manual Procedures	ACO Design Data Approval	DER Approval Authority	FSDO Review of FQCS
1	Yes	Yes	Yes Certificating ACO through the Geographical ACO	(Recommend Approval Only)	Yes
2	Yes	Yes	Yes Geographic ACO	Yes	Yes
3	Yes	Yes	Only Acceptable Data is Required for this Category ACO Intervention Only on Request by AFS	Not Required	Yes

Fabrication part categories used in this AC were derived from FAA Order 8120.2, Production Approval and Certificate Management Procedures.

Category 1 Part: A fabricated part, the failure of which could prevent continued safe flight and landing; resulting consequences could reduce safety margins, degrade performance, or cause loss of capability to conduct certain flight operations.

Category 2 Part: A fabricated part, the failure of which would not prevent continued safe flight and landing, but would reduce the capability of the aircraft or the ability of the crew to cope with adverse operating conditions or subsequent failures.

Category 3 Part: A fabricated part, the failure of which would have no effect on the continued safe flight and landing of the aircraft.

APPENDIX 2. CATEGORY PARTS LIST

The information contained in this appendix should be used as a guideline in determining a parts criticality. It is not all inclusive and specific questions concerning parts not addressed can be evaluated by contacting the certificate holding ACO.

The CPL has not been reviewed for update since July 1, 2004 and is not scheduled for any future update. Current FAA Safety Management System initiatives could render the CPL obsolete, at which time it will be eliminated. The CPL posted on the Internet is for information only and if used for other purposes than what is stated above it is solely at the user's risk.

Structural Assemblies	CFR part	Structural Elements	CFR part	Hydraulic Pneumatic Components	CFR part	Propulsion System Components	CFR part	Systems and Equipment	CFR part
Fuselage (23-1), (25-1)	23, 25	**Fuselage Structural Elements** Pressure Bulkheads (23-1), (25-1) Keel Beam (25-1) Longeron/Stringer (25-2) Floor Beam (25-2) Plates/Skins (25-2) Fuselage to Wing Attach Fittings (25-1) Stabilizer to Fuselage Attach Fittings (25-1) Gear to Fuselage attach Fittings (25-1) Door Hinge (on Fuselage) (25-1) Fuselage Panels (23-1), (25-1)	23, 25	Hydraulic Main Pump (23-1), (25-2), (27-1), (29-1) Main Accumulator (25-2) Main Reservoir (25-2) Auxiliary Pump (25-2)	23, 25, 27, 29	Software Thrust (EEC) (23-1), (25-1)	23, 25	**Electrical Power System** Alternator/Generator Drive System (23-2),(25-2) AC Generator-Alternator (23-2) (25-2) AC Inverter (23-2) (25-2) Phase Adapter (25-2) AC Regulator (25-2) **Fire Protection** Smoke Detection (25-2), (27-2), (29-2) Fire Detection (25-2), (27-2), (29-2) Overheat Detection (25-2), (27-2), (29-2) Extinguishing System (25-2), (27-2), (29-2) Fire Bottle-Fixed (25-2), (27-2), (29-2)	23, 25, 27, 29
Flight Control Surfaces Allerons (23-1), (25-1) Rudder (23-1), (25-1) TE Flaps (23-1), (25-2) LE Devices (25-2) Elevator (23-1), (25-1) Spoilers (25-2)	23, 25	**Flight Control Structural Elements** Aileron Tabs (25-2) Jackscrew (23-1), (25-1) Bellcranks (23-1), (25-1) Flight Control Cables (23-1), (25-1)	23, 25	Flight Control Servo Actuators (25-2), (27-1), (29-1) Flap Actuator (25-2) Rudder Actuator (25-2) Stabilizer Actuator (25-2)	25, 27, 29	Thrust Reversers (23-1), (25-2) Auxiliary Power Units (23-1) FADEC (23-1)	23, 25	**Fuel System** Boost Pumps (23-1), (25-2), Transfer Valves (23-1), (25-2) Fuel S O V (23-1), (25-1) Digital Fuel Flow System (23-2) (25-2) Fuel Dump (25-2) Fuel Hose (Single engine applications ONLY) (23-2) (27-2), (29-2) Fuel Quantity Indicator (23-2) (25-2), (27-2), (29-2) Fuel Flow Indicating (27-2), (29-2) (23-2) Fuel Pressure Indicating (27-2), (29-2) (23-2) Fuel Pump (25-2), (27-1), (29-1) **Engine Lubrication System** Oil Cooler (Single engine applications ONLY) (23-2) (27-2), (29-2)	23, 25, 27, 29

CATEGORY PARTS LIST

Structural Assemblies	CFR part	Structural Elements	CFR part	Hydraulic Pneumatic Components	CFR part	Propulsion System Components	CFR part	Systems and Equipment	CFR part
								Engine Liquid Cooling System Radiators, Coolant Pumps, Water Hoses and Head Gasket (Single engine applications ONLY) (23-2) (27-2), (29-2) **Crew Oxygen System** (27-2), (29-2) **Indicating System** Warning, Caution, and Advisory Lights (27-2), (29-2), Main Rotor Indicating System (27-2), (29-2) Engine Power (27-2), (29-2) Engine Temperature (27-2), (29-2)	
Empennage Horizontal Stabilizers (23-1), (25-1) Elevators (23-1), (25-1) Vertical Stabilizers (23-1), (25-1) Rudder (23-1), (25-1)	23, 25	**Empennage Structural Elements Horizontal Stabilizer** Spars/Ribs (23-2) (25-2) Plates/Skins (23-2) (25-2) Tab Structure (23-2) (25-2) Attach Fitting (23-2) (25-2) **Empennage Structural Elements Elevator** Spars/Ribs (23-2) (25-2) Plates/Skins (23-2) (25-2) Tab Structure (23-2) (25-2) Attach Fitting Elevator Tab (23-2) (25-2) **Empennage Structural Elements Vertical Stabilizer** Spars/Ribs (23-2) (25-2) Plates/Skins (23-2) (25-2) Attach Fitting (23-2) (25-2) Ventral Structure (23-2) (25-2) **Empennage Structural Elements Horizontal Stabilizer** Spars/Ribs (23-2) (25-2) Plates/Skins (23-2) (25-2) Tab Structure (23-2) (25-2) Attach Fitting (23-2) (25-2)	23,25	Control Valves (23-2), (25-2) Shut Off Valves (23-2), (25-2) Rudder Power Control Units (23-1), (25-2) Rudder Power Control Unit (Boeing 737) (25-1)	23, 25	**Engine Cowling Systems** Inlets(23-1), (25-2) Nacelles (23-1), (25-2) Fairings (23-1), (25-2)	23, 25	**Brake System and Assembly Components** Brakes(23-1), (25-1) Anti-Skid Valves (23-2), (25-2) Wheel Assemblies (23-1) (25-2) Tire Casing (25-2) Tire Tube (25-2) Anti Skid Section (25-2) Master Cylinder/Brake Valve (25-1)	23, 25
Wing Structure (23-1), (25-1)	23, 25	**Wing Structure Structural Elements**	23, 25			**Airborne Software Controlled Equipment**	23, 25, 33	NOTAR (High Speed Fan) (27-1), (29-1)	27, 29

CATEGORY PARTS LIST

Structural Assemblies	CFR part	Structural Elements	CFR part	Hydraulic/Pneumatic Components	CFR part	Propulsion System Components	CFR part	Systems and Equipment	CFR part
		Panels (23-1), (25-2) Wing Webs (23-1), (25-2) Spars (23-1), (25-1) Ribs/Bulkheads (23-2) (25-2) Longeron/Stringers (25-2) Center Wing Box (25-1) Auxilliary Structure (25-2) Wing Attach Fitting (25-1) NAC/Pylon Wing Fitting (23-1), (25-1) Blended Winglet (25-2)				Software Level A (per RTCA/DO 178B), (23-1) (25-1), (33-1) Software Levels B, or C (per RTCA/DO 178B) (23-2) (25-2), (33-2)		**Automatic Flight Control Systems/Stability Augmentation Systems** Flight Control Computers (27-1), (29-2) Servo/Linear Actuators (27-1), (29-1) **Electrical Power Systems** AC Generator (27-2), (29-2) AC Inverters (27-2), (29-2) Battery (27-2), (29-2) Starter Generator (27-2), (29-2)	
Main Rotor Hubs (27-1), (29-1) Trunnions (27-1), (29-1) Yokes (27-1), (29-1) Spindles (27-1), (29-1) Grips (27-1), (29-1) Pitch Horns (27-1), (29-1) Drag Braces (27-1), (29-1) Blades (27-1), (29-1) Blade Spars (27-1), (29-1) Damper Hubs (27-1), (29-1) Retention Pins/Straps/Bolts (27-1), (29-1) Tension-Torsion Straps (27-1), (29-1) Strap Packs (27-1), (29-1) Pillow Blocks (27-1, (29-1) Droop Restraint Bolts (27-1), (29-1) Elastomeric Dampers (27-1), (29-1) Bearings (27-1), (29-1) Bushings (27-1), (29-1)	27, 29	**Main Rotor Control** Swashplates (27-1), (29-1) Swashplate Drives (27-1), (29-1) Anti-Drives (27-1), (29-1) Anti- Links (27-1), (29-1) Pitch Change Links (27-1), (29-1) Drive Links (27-1), (29-1) Drive-Levers (27-1), (29-1) Gimbal Stabilizer Bars (27-1), (29-1) Mixing Levers (27-1), (29-1) Collective Sleeves (27-1), (29-1) Cyclic & Collective Control Sticks (27-1), (29-1) Actuator Supports (27-1), (29-1) Control System Tubes/Bolts/Pins (27-1), (29-1)	27, 29			**Propellers** (Hubs (35-1), Blades (35-1) Blade Retention Devices (35-1) Counter Weights (35-1) Pitch Control Systems Including PCU (35-1) Governors (35-1) Actuators (35-1) PCU Mechanisms (35-1) Propeller Electronic Controls (35-1), and Propeller Valve Modules (35-1)	35	**Drive Systems** Masts (27-1), (29-1) Gear Boxes (27-1), (29-1) Driveshafts (27-1), (29-1) Bearings (27-1), (29-1) Hanger Bearings (27-1), (29-1) Clutches (27-1), (29-1) Couplings (27-1), (29-1) **Transmissions** Cases (27-1), (29-1) Gears (27-1), (29-1) Clutches (27-1), (29-1) Oil Pumps (27-1), (29-1) Bearings (27-1), (29-1)	27, 29
Nose Section (23-1), (25-1) Radomes (23-2), (25-2)	23, 25	**Fuel Tank Structure** Fuel Cell (23-1), (25-1), (27-1), (29-1)	23, 25, 27, 29			Drive Belts (27-1), (29-1)	27, 29	Stall Warning (23-2), (25-2)	23, 25
Nacelles/Pylons (23-1), (25-1) **Doors** Passenger Crew Doors (25-1) Emergency Exit Door (25-2) Landing Gear Doors (25-2) Cargo Baggage Door (25-2)	23, 25	**Nacelles/Pylons Structural Elements** Attachment Fittings (25-1), (27-1), (29-1) Bulkhead/Firewalls (Nac/Pylon) (23-2) (25-2),	23, 25 27, 29			**Gas Turbine Engines-Engine Rotors** Fan Blades (33-1), Disks (33-1), Blisks (33-1), Impellers (33-1), Spools (Drum Rotors) (33-1),	33	**Anti-Ice System** Pitot/Static Anti-Ice (23-2) (25-2) Air Foil Anti Ice/Deice (23-2) (25-2), (27-2), (29-2) Window/Windshield & Doors	(23-2) 25, 27, 29

CATEGORY PARTS LIST

Structural Assemblies	CFR part	Structural Elements	CFR part	Hydraulic/Pneumatic Components	CFR part	Propulsion System Components	CFR part	Systems and Equipment	CFR part
		Longerons/Stringers (Nac/Pylon) (25-2) Plates/Skins (Nac/Pylon) (25-2) Attach Fittings (Nac/Pylon) (23-2) (25-1), (27-1), (29-1) Engine Struts (23-1), (25-1), (27-1), (29-1) Engine Mounts (23-1), (25-1), (27-1), (29-1) Pylon Lift/Link Assemblies (27-1), (29-1)				Thermal Shields for cooling of main rotors (33-1), Cooling Plates (33-1), Main Rotor Rotating Spacers and Seals (33-1), Main Line Engine Shafts (i e , low and high pressure rotor shafts, propeller shafts for turboprop applications and power transmission shafts for input to propeller and transmission gearboxes) (33-1), Main Line Engine Bearings (33-2), Rotating Compressor & Turbine Airfoils (33-2), Spinners (33-2) **Gas Turbine Engines (Con't)** Main Engine Mounts (i e , redundant designs)(33-1), High Pressure Vessels (i e Casting subject to compressor discharge pressure & combuster Pressure) (33-1), Containment Structures (33-1), Primary Structures (i.e. structures that provide support and rigidity of the main engine backbone and for attachment of engine to airframe) (33-1), Main Engine Mounts (i e , redundant designs) (33-2), Electronic Engine Controls/Full Authority Digital Electronic Controls (33-2), Gas Path (Static & Variable Nozzle Guide Vanes) (33-2), Control System Actuators (33-2), Combustion Liners (33-2), Fuel Nozzles (33-2)	33	(23-2) (25-2) Antenna/Radome Anti Ice (25-2) Intake Anti-Ice/Deice (27-2), (23-2) (29-2)	
Flight Control Mechanisms (23-1), (25-1)	23, 25	Lift/Compression Struts (23-1) Flying Wires (23-1) Floats (23-1), Skis (23-1) Tail Wheels (23-1)	23			**Reciprocating Engines** Crankshafts (33-1) Connecting Rods Assembly (33-1) Connecting Rod Bearings (33-1) Pistons (33-1) Wrist Pins (33-1) Cylinders (33-1)	33	**Airborne Software Systems** Software Level A (per RTCA/DO 178B), (23-1) (25-1), (27-1), (29-1) Software Levels B, or C (per RTCA/DO 178B) (23-2) (25-2), (27-2), (29-2) **Navigation System** Wind Shear Detection	23, 25, 27, 29

CATEGORY PARTS LIST

Structural Assemblies	CFR part	Structural Elements	CFR part	Hydraulic Pneumatic Components	CFR part	Propulsion System Components	CFR part	Systems and Equipment	CFR part
						Cylinder Heads (33-1) Engine Mounts (33-1) Crankcase (33-2) Crankshaft Bearings (33-2) Valve Train (valves, valve springs, pushrods, camshafts, rocker shaft assembly) (33-2) Fuel Delivery Systems (carburetors, injectors, fuel pumps) (33-2), Valve Train/Accessory Drive Gears (33-2) Electronic Engine Control (EEC)/Full Authority Digital Electronic Controls (33-2)		System (25-2) Ground Proximity System (23-2) (25-2) Air Collision Avoidance (TCAS) (23-2) (25-2) Air Speed Indicator (23-2) (27-2), (29-2) Altimeter (23-2) (27-2), (29-2) Air Data Computer (23-2) (27-2), (29-2) Attitude Gyro and Indication (23-2) (27-2), (29-2) Directional Gyro and Indication (23-2) (27-2), (29-2) Pitot/Static System (23-2) (27-2), (29-2) Localizer/VOR System (23-2) (27-2), (29-2) Glide Slope System (23-2) (27-2), (29-2)	
Tail Rotor and Controls Hubs (27-1), (29-1) Yokes (27-1), (29-1) Trunnions (27-1), (29-1) Blades (27-1), (29-1) Blade Spars (27-1), (29-1) Grips (27-1), (29-1) Pitch Change Links (27-1), (29-1) Pitch Change Bearings (27-1), (29-1) Output/Drive Shafts (27-1), (29-1) Gearsets (27-1), (29-1) Strap Packs (27-1), (29-1) Pedal Linkages (27-1), (29-1) Bellcranks (27-1), Flapping & Lead/Lag Bearings (27-1), (29-1)	27, 29	**Balloons** Baskets (31-1) Envelopes (31-1)	31			**Balloon Burner Systems** Burner Units (31-1)	31	**Balloon Fuel Systems** Fuel Manifolds (31-1)	31
Fuselage (27-1), (29-1) Tail Boom (27-1), (29-1) Tail Boom Struts (27-1), (29-1) Tail Boom Mount Fittings (27-1), (29-1) Vertical Stabilizers (27-1),	27, 29	**Main Landing Gear** Struts (23-1), (25-1), (27-1), (29-1) Crosstubes (23-1), (25-1), (27-1), (29-1) Drag Links (23-1), (25-2), (27-1), (29-1)	23, 25, 27, 29	**Main Landing Gear Components** Landing Gear Actuator (23-1), (25-2), (27-1), (29-1) Selector Valve (25-2)	23, 25, 27, 29	**Gas Turbine Engines-Static Structures** Engine Mounts (i e non-redundant designs) (33-1) High Pressure Vessels (Casings Subject to	33	**Window-Windshield System** Flight Compartment Windows (23-1), (23-2) (25-1) Passenger Compartment	23, 25 27, 29

CATEGORY PARTS LIST

Structural Assemblies	CFR part	Structural Elements	CFR part	Hydraulic Pneumatic Components	CFR part	Propulsion System Components	CFR part	Systems and Equipment	CFR part
(29-1) Horizontal Stabilizers (27-1) (29-1) Elevator (27-1), (29-1) Elevator Horn (27-1), (29-1) Skin Assemblies (27-1), (29-1) Bonded Panel Assemblies (27-1), (29-1) Spars (27-1) (29-1)		Fuse Pins (25-2) Attach Section (25-1) Extension and Retract System (25-2) Landing Gear Door Retract Section (25-2) Landing Gear Position and Warning (27-2) (29-2) **Nose Landing Gear** (23-1), (25-1) Strut/Axle (25-1) Attach Section (25-1) Steering Links (23-1) (25-2) (27-1) (29-1)		Landing Gear Door Actuator (25-2) **Nose Landing Gear Components** Shimmy Damper (25-2) Steering Unit (25-2)		Compressor Discharge Pressure & Combuster Pressure) (33-1) Containment Structures (33-1) Primary Structures (that provide support and rigidity of the main engine backbone and for attachment of engine to airframe (33-1)		Windows (25-2) Door Windows (23-2) (25-2) **VHF Communication System** (27-2), (29-2)	